

## CLAIMS

What is claimed is:

1           1.     A laser-programmable fuse structure for an integrated circuit device,  
2     comprising:  
3                 a conductive layer, said conductive layer completing a conductive path  
4     between wiring segments included in a wiring layer; and  
5                 an organic material encapsulated underneath said conductive layer;  
6                 wherein the fuse structure is blown open by application of a beam of laser  
7     energy thereto.

1           2.     The fuse structure of claim 1, further comprising:  
2                 a liner material in electrical contact with said wiring segments and said  
3     conductive layer, said liner material further encapsulating said organic material between  
4     said wiring layer and said conductive layer.

1           3.     The fuse structure of claim 1, wherein said organic material is selected  
2     from a group that includes a polyimide, a polyamide, a polyarylene ether, a polyaromatic  
3     hydrocarbon (PAH), and a conductive polyaniline.

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2           4.     The fuse structure of claim 1, wherein said liner material is selected from a  
group that includes TaN, Ta, TiN, Ti, W, WN, TaSiN, TiSiN, or alloys therefrom.

1           5.     The fuse structure of claim 1, wherein said conductive layer is selected  
2 from a group that includes TaN, Ta, TiN, Ti, W, WN, TaSiN, TiSiN, or alloys therefrom.

1           6.     The fuse structure of claim 2, further comprising:  
2                 a pair of vias formed within an insulating layer and extending down to said  
3 wiring segments; and  
4                 a mesa region of said insulating layer formed between said pair of vias;  
5                 wherein said liner material is formed upon sides of said mesa region and  
6 said wiring segments.

1           7.     The fuse structure of claim 6, wherein said pair of vias is filled with said  
2 organic material.

1           8.     The fuse structure of claim 7, wherein said organic material further  
2 occupies an inner area of the fuse structure, said inner area between the top of said mesa  
3 region and said conductive layer.

1           9.     The fuse structure of claim 8, wherein said conductive layer covers said  
2 inner area and said organic material, thereby completing said conductive path.

1           10.     A method for forming a laser-programmable fuse structure for an  
2 integrated circuit device, the method comprising:  
3                   forming a conductive layer to complete a conductive path between wiring  
4 segments included in a wiring layer; and  
5                   encapsulating an organic material underneath said conductive layer;  
6                   wherein the fuse structure is blown open by application of a beam of laser  
7 energy thereto.

1           11.     The method of claim 10, further comprising:  
2                   forming a liner material in electrical contact with said wiring segments and  
3 said conductive layer, said liner material further encapsulating said organic material  
4 between said wiring layer and said conductive layer.

1           12.     The method of claim 10, wherein said organic material is selected from a  
2 group that includes a polyimide, a polyamide, a polyarylene ether, a polyaromatic  
3 hydrocarbon (PAH), and a conductive polyaniline.

1           13.     The method of claim 10, wherein said liner material is selected from a  
2 group that includes TaN, Ta, TiN, Ti, W, WN, TaSiN, TiSiN, or alloys therefrom.

1           14.     The method of claim 10, wherein said conductive layer is selected from a  
2 group that includes TaN, Ta, TiN, Ti, W, WN, TaSiN, TiSiN, or alloys therefrom.

1           15.    The method of claim 11, further comprising:  
2                   forming a pair of vias within an insulating layer, said vias extending down  
3           to said wiring segments; and  
4                   a mesa region of said insulating layer thereby being formed between said  
5           pair of vias;  
6                   wherein said liner material is formed upon sides of said mesa region and  
7           said wiring segments.

1           16.    The method of claim 15, further comprising filling said pair of vias with  
2           said organic material.

1           17.    The method of claim 16, wherein said organic material further occupies an  
2           inner area of the fuse structure, said inner area between the top of said mesa region and  
3           said conductive layer.

1           18.    A laser-programmable fuse structure for an integrated circuit device,  
2           comprising:  
3                   an electrically conductive organic material, said electrically conductive  
4           organic material completing a conductive path between wiring segments included in a  
5           wiring layer; and  
6                   said electrically conductive organic material further filling a pair of vias  
7           formed within an insulating layer, said pair of vias extending down to said wiring  
8           segments;  
9                   wherein the fuse structure is blown open by application of a beam of laser  
10          energy to said electrically conductive organic material.